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**UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF VIRGINIA  
Alexandria Division**

2015 NOV 30 A 10:19

LIMELIGHT NETWORKS, INC.,

Plaintiff,

v.

XO COMMUNICATIONS, LLC., AND  
AKAMAI TECHNOLOGIES, INC.,

Defendants.

Case No.

3:15CV720-JAG

**JURY TRIAL DEMANDED**

**COMPLAINT**

Limelight Networks, Inc. ("Limelight" or "Plaintiff") hereby alleges for its Complaint against Defendants XO Communications, LLC ("XO") and Akamai Technologies, Inc. ("Akamai") (collectively, "Defendants") on personal knowledge as to its own actions and on information and belief as to the actions of others, as follows:

**NATURE OF THE ACTION**

1. This is a patent infringement action by Limelight to end Defendants' unauthorized and infringing manufacture, use, sale, offering for sale, and/or importation of products and methods incorporating Limelight's patented inventions.
2. Limelight holds all substantial rights and interest in the Patents-in-Suit described below, including the exclusive right to sue Defendants for infringement and recover damages.
3. Plaintiff Limelight seeks monetary damages, prejudgment interest and injunctive relief for Akamai's and XO's past and on-going infringement of the Patents-in-Suit.

### **THE PARTIES**

4. Limelight Networks, Inc. (“Limelight”) is a corporation organized and existing under the laws of Delaware with its principal place of business at 222 South Mill Ave., Suite 800, Tempe, Arizona, 85281.

5. On information and belief, Defendant XO Communications, LLC. (“XO”) is a corporation existing and organized under the laws of Delaware and has its principal place of business at 13865 Sunrise Valley Drive, Herndon, VA 20171.

6. On information and belief, Defendant Akamai Technologies, Inc. (“Akamai,” or “Defendant”) is a corporation existing and organized under the laws of Delaware and has its principal place of business at 150 Broadway, Cambridge, Massachusetts, 02142.

7. Founded in 2001, Limelight is a leader in digital content delivery. Its content acceleration technologies and services enable publishers to deliver their digital content (*e.g.*, web pages, videos, full-length movies and television shows, operating system updates, and online games) on any device, anywhere in the world.

8. Akamai also sells products and services for digital content delivery. As such, numerous Limelight products and services compete with those offered by Akamai. For example, Limelight and Akamai each operate a global Content Delivery Network (“CDN”)—a geographically distributed network of servers that their customers, such as web sites, software applications, video-on-demand and streaming media providers, can use to accelerate content delivery to their end users. Such CDNs accelerate content delivery through a variety of techniques, such as caching content at numerous servers so that the content can be delivered to end users from locations close to the user. XO is a telecommunications company that is engaged in an extensive partnership with Akamai, including as a reseller of Akamai services and as a partner in deployment and operation of hardware and software components of a CDN.

9. While Akamai was one of the first to market with a CDN solution, newer entrants such as Limelight have rapidly innovated and developed new technology contributions—and obtained patent protection for those contributions—which Akamai has then implemented in order to remain competitive.

### **JURISDICTION AND VENUE**

10. This action for patent infringement arises under the patent laws of the United States, Title 35 of the United States Code.

11. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

12. This Court has general and specific personal jurisdiction over Defendant XO. XO has substantial contacts with the forum as a consequence of establishing its headquarters in Virginia and in this District, and XO conducts substantial business in Virginia. XO sells, makes, uses, and offers for sale its products and services, including products and services that infringe Plaintiff's patents, within the state of Virginia, including to customers in Virginia. Such customers include USA Today, a customer it shares with Akamai in connection with use of systems that infringe the asserted patents. In addition, on information and belief, XO has established data centers for use in infringing the asserted Limelight Patents in this district, including at 12100 Sunrise Valley Drive Reston, VA, and at 8613 Lee Highway, Fairfax, VA 22031.

13. XO has committed and continues to commit acts of patent infringement, including making and using infringing systems, and performing infringing methods, within this district, including in conjunction with Akamai.

14. This Court has general and specific personal jurisdiction over Defendant Akamai. Akamai has substantial contacts with the forum as a consequence of conducting substantial

business in Virginia and in this District, including establishment of offices at 11111 Sunset Hills Road, Suite 250, Reston, VA 20190. In addition, Akamai has established a significant presence in this forum by locating its content delivery servers accused of infringing the patents asserted in this action in Virginia and in this District. For example, according to publicly available documentation, Akamai has placed more than 200 racks of its accused content delivery servers and associated hardware and software at a data center located at 12100 Sunrise Valley Drive Reston, VA 20191, and has placed an additional 170 racks of its accused content delivery servers and associated hardware and software at a data center located at 1780 Business Center Drive, Reston, VA 20190. Akamai has also located its accused content delivery servers in data centers in Sterling, VA, Manassas, VA, Ashburn, VA, and Vienna, VA, each of which are located in this District. The operation of these content delivery servers in Virginia and in this District constitutes infringement of the asserted Limelight patents in this District. In addition, this Court has jurisdiction over Akamai because Akamai has conducted business with a Virginia-based corporation, XO, for the purpose of infringing the patents.

15. Akamai has committed and continues to commit acts of patent infringement, including making and using infringing systems, and performing infringing methods, within this district, including in conjunction with XO.

16. Venue is proper for XO in this District under 28 U.S.C. §§ 1391(b) and (c), and 1400(b) because, as described above, a substantial part of the events giving rise to Limelight's claims occurred in this district, and because XO, which is headquartered in Herndon, Virginia, resides within this district.

17. Venue is proper for Akamai in this District under 28 U.S.C. §§ 1391(b) and (c), and 1400(b) because, as described above, Akamai has a regular and established practice of

business in this district and has committed acts of infringement in this district, including by virtue of its far-reaching relationship with XO, whose headquarters are in this district. In 2001, Akamai and XO entered into a strategic agreement under which “XO will provide co-location space in its data centers for the deployment of additional Akamai servers,” and “XO’s interconnection bandwidth related services and hosting capabilities [will] help Akamai to expand its reach to enable users to benefit from improved performance and accelerated delivery of the Web’s most popular streaming media, software applications and content served on Akamai’s globally distributed network”—in short, to co-locate at XO-owned or XO-administered data centers the products and services accused of infringing the Limelight patents asserted in this action. “XO Communications and Akamai Announce Strategic Alliance,” dated May 17, 2001, at [http://www.akamai.eu/html/about/press/releases/2001/press\\_051701.html](http://www.akamai.eu/html/about/press/releases/2001/press_051701.html) (last visited November 29, 2015). On information and belief, one such data center is located at 12100 Sunrise Valley Drive, Reston, VA. XO also resells Akamai’s accused content delivery services to its customers.

### **JOINDER**

18. Joinder is proper under 35 U.S.C. § 299 because questions of fact common to each Defendant will arise in the action. As detailed below, Limelight alleges patent infringement by Defendants in connection with their making and using systems, and their practice of methods, for accelerating the delivery of digital content based on hardware and software developed by Defendant Akamai. As such, factual issues regarding the operation of that hardware and software are common to Akamai and to XO.

19. Joinder is further proper because some of Defendants’ infringement arises out of the same transaction, occurrence, or series of transactions or occurrences relating to the making, using, importing into the United States, offering for sale, or selling of the same accused product

or process. For example, as described below, while each of XO and Akamai can directly infringe the asserted claims, when the infringing system includes a combination of XO-deployed and Akamai servers, Akamai and XO act jointly or in concert to perform the infringing acts, and in that instance, the infringement is not complete until both XO and Akamai have provided or performed their respective parts.

### **THE ASSERTED PATENTS**

20. As a global leader in digital content delivery, Limelight has sought patent protection for many of its innovations in this field, including the patents asserted in this matter.

### **THE CONDITIONAL PROTOCOL CONTROL PATENTS**

21. On May 11, 2010, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 7,715,324 (“the 324 Patent”), entitled “Conditional Protocol Control.” A copy of the 324 Patent is attached to the Complaint as Exhibit A.

22. On December 10, 2014, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,750,155 (“the 155 Patent”), entitled “Conditional Protocol Control.” A copy of the 155 Patent is attached to the Complaint as Exhibit B.

23. The 324 and 155 Patents arose out of the innovative work performed by Limelight engineers to utilize selective optimizations of the Transport Control Protocol (“TCP”), a core Internet protocol that governs how content is delivered over the web, in order to accelerate their customers’ delivery of Internet content, including web pages, downloadable files, and media content such as images or audio/video, to their end users. The inventors of the 324 and 155 Patents developed ways to use TCP optimizations to accelerate such content conditionally, such as on a customer-by-customer, or file-by-file basis, in order to optimize this content delivery for any given set of circumstances.

24. In October 2008, Limelight licensed the basic technology and software for optimizing TCP connections from FastSoft, Inc., a startup company that developed an algorithm known as FastTCP, which allowed for accelerating TCP connections on one end (the server end) of an Internet connection. FastSoft had no experience in content acceleration in the context of CDNs such as those provided by Limelight and by Akamai, and instead pursued a business model whereby it sought to sell hardware appliances that implemented its algorithm. On top of the elementary technology supplied by FastSoft, Limelight engineers developed a complete TCP optimization solution for CDNs that could analyze a request for content received by a content server and, based on information obtained from the request, such as the identity of the customer or the type of content requested, conditionally apply a set of transport protocol optimizations on a connection by connection basis. Because optimization could be applied conditionally on a connection-by-connection basis under the Limelight solution, each connection could be optimized differently, according to a configurable profile.

25. Limelight sought and obtained patent protection for its conditional protocol control innovations, including the 324 and 155 Patents.

26. Limelight also shared its conditional protocol control innovations with FastSoft, including providing FastSoft with the functional requirements for its Deliver XD service that implemented these innovations, and collaborating with FastSoft on the improvement of its technology for use within a Content Delivery Network.

27. In September 2012, Akamai announced that it had acquired FastSoft, and had integrated FastSoft's engineering team—a team that had been exposed to Limelight's innovations—into Akamai. Shortly thereafter, Akamai communicated to Limelight that all

FastSoft products were entering their End Of Life (“EOL”) phase, and support for these products would be discontinued within one year, or earlier if allowed under the license agreement.

28. At least by September 2013, Akamai had deployed FastSoft-based TCP protocol optimization in its own Content Delivery Network in a manner strikingly similar to the implementation created and patented by Limelight. Like Limelight, Akamai’s TCP optimization does not utilize FastSoft hardware appliances, but instead deploys TCP optimizations in software at content servers in the Content Delivery Network. Like Limelight, Akamai’s TCP optimization is conditional, highly configurable via a configuration profile, and can be set connection-by-connection. Like Limelight, Akamai’s TCP optimization parameters are based on analysis of the received content request. Each of these aspects is described in Limelight’s conditional protocol control patents prior to Akamai’s deployment.

#### **OTHER LIMELIGHT PATENTS**

29. On October 7, 2014, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,856,263 (“the 263 Patent”), entitled “Systems and methods thereto for acceleration of web pages access using next page optimization, caching and pre-fetching techniques.” A copy of the 263 Patent is attached to the Complaint as Exhibit C.

30. On March 25, 2014, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,683,002 (“the 002 Patent”), entitled “Content delivery network cache grouping.” A copy of the 002 Patent is attached to the Complaint as Exhibit D.

31. On April 21, 2015, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 9,015,348 (“the 348 Patent”), entitled “Dynamically selecting between acceleration techniques based on content request attributes.” A copy of the 348 Patent is attached to the Complaint as Exhibit E.



32. On December 24, 2013, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,615,577 (“the 577 Patent”), entitled “Policy based processing of content objects in a content delivery network using mutators.” A copy of the 577 Patent is attached to the Complaint as Exhibit F.

33. Limelight owns all substantial right, title, and interest in the 324, 155, 002, 263, 348, and 577 Patents, and holds the right to sue and recover damages for infringement thereof, including past infringement.

**COUNT I AGAINST AKAMAI:**

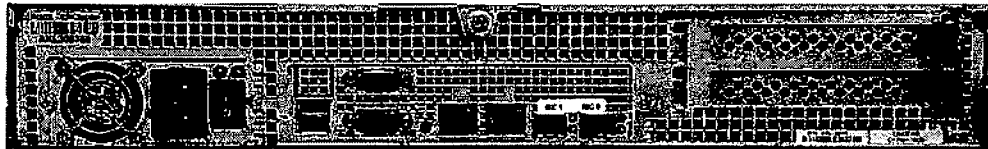
**INFRINGEMENT OF U.S. PATENT NO. 8,750,155**

34. Limelight incorporates and realleges paragraphs 1-33 above as if fully set forth herein.

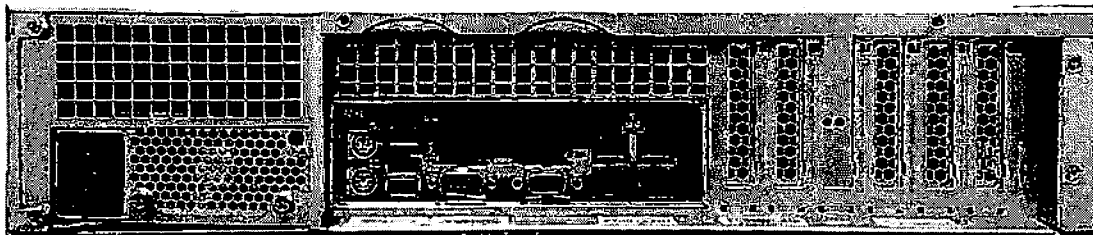
35. On information and belief, Akamai has infringed and continues to infringe one or more claims of the 155 Patent, including but not limited to claims 1, 3, 8, 9, 10, 11, 12, 13, 15, 18, 19, and 20 pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, the Akamai Intelligent Platform, including a content delivery network with edge servers running Akamai’s TCP optimization functionality, as well as services associated therewith (the 155 Infringing Products). Based on information and belief, and publicly available documentation, the 155 Infringing Products perform TCP optimization by modifying pre-existing TCP settings based upon parameters that are determined at least in part with reference to information in the URLs of end-user requests processed by Akamai.

36. Further, Akamai’s edge servers with TCP optimization meet the requirements of the claimed content distribution server, as reflected by publicly available Akamai documentation.

On information and belief, to perform their basic role, Akamai's edge servers, including edge servers that are co-located with XO, have multiple network ports to send and receive data. For example, Akamai publishes the following images showing Akamai servers having two Ethernet ports:



Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/images/Server\\_Hardware/X4i\\_1-5x18\\_10G\\_Rear\\_Large.jpg](https://fieldtech.akamai.com/heguide/images/Server_Hardware/X4i_1-5x18_10G_Rear_Large.jpg) (last visited November 29, 2015).



Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/images/Server\\_Hardware/X1\\_2x8\\_CacheH\\_Rear\\_Large.jpg](https://fieldtech.akamai.com/heguide/images/Server_Hardware/X1_2x8_CacheH_Rear_Large.jpg) (last visited November 29, 2015). Further information about Akamai's deployed network interfaces can be found in Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/Network\\_Packages.html](https://fieldtech.akamai.com/heguide/Network_Packages.html) (last visited November 29, 2015).

37. Further, Akamai's geographically distributed deployments of its edge servers, as deployed and operated for example by XO in its data centers, include routers that "allow Akamai to direct traffic between Akamai's equipment and the providers that Akamai connects to."

[Akamai Hands And Eyes Guide], *available at* [https://fieldtech.akamai.com/heguide/Router\\_Hardware.html](https://fieldtech.akamai.com/heguide/Router_Hardware.html). When such equipment is deployed in a manner that connects Akamai's edge servers to the Internet, for example by XO in its data centers, it likewise has multiple ports configured to send and receive data over a connecting network.

38. Likewise, Akamai's servers, including on information and belief servers that are co-located with XO, include processors:

#### **Server Generations**

The following server generations are listed from most recently deployed to no longer being deployed. This a brief overview of each generation's specifications.

<b>Generation</b>	<b>Specifications ( Partial List )</b>
X8	Intel Broadwell DE
X7	Intel Skylake
X6m	Intel Haswell E5-2600 V3 series, 16G to 256G DDR4 Registered
X6	Intel Haswell E3-1200 V3 series, 16G or 32G DDR3
X5	Intel Sandy Bridge E5 2600 EP series, 128GB or 256GB DDR3
X4i	Intel Ivy Bridge E3-1270 V2, 16G DDR3
X4	Intel Sandy Bridge E3-1270, 16G DDR3
X2	Intel Nehalem X3470, 8G to 32G DDR3
X1	Intel Nehalem X3470, 8G DDR3
G10	AMD Opteron 6204 Quad Core, 64G DDR3
G9	AMD Opteron 4184 Hexa Core, 8G DDR3
G7	AMD Opteron 1389 Quad Core, 8G DDR2
G6	AMD Opteron 2381 Quad Core, 8G DDR2
G5	AMD Athlon II 240e Dual Core, 8G DDR3
G4	AMD Opteron 1218 Dual Core, 4G DDR2
G3	AMD Opteron 244, 2G or 4G M DDR1
G2	AMD Opteron 244, 1G or 2G DDR1
G1	AMD Opteron 244, 512M DDR1

Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/Server\\_Hardware.html](https://fieldtech.akamai.com/heguide/Server_Hardware.html) (last visited November 29, 2015). The 155 Infringing Products include a protocol handler, such as the TCP/IP protocol stack implementation, that establishes and maintains connections with end-users. The 155 Infringing Products have storage that they use to store customer content to serve to end-users.

39. The 155 Infringing Products perform TCP optimization in a manner that infringes the asserted claims. Specifically, the 155 Infringing Products monitor connections with end-users for requests. When they receive end-user requests the 155 Infringing Products determine parameters that relate to processing and memory capabilities in the TCP protocol, such as

maximum buffer space and socket buffer values. These determinations are made by the edge server, including on information and belief in those cases where the edge server is co-located with XO, based at least in part on reference to information in the URL of the request (such as for example, the hostname field or the customer ID). This information is utilized, in addition to other information, for the Akamai server to determine how aggressive the TCP optimization should be for that connection. Once that determination is made, the TCP settings are altered to put that new optimization into effect by changing pre-existing TCP values to new values that are consistent with the correct level of TCP optimization. As Akamai's documentation explains in detail:

At a high-level, it operates in two modes: slow-start and congestion-avoidance. Those are different phases in the protocol that attempt to probe the network for available bandwidth using slightly different approaches. TCP maintains what's referred to as a congestion window, which determines how many packets can be in-flight on the network at any point in time. The higher the congestion window, the greater TCP believes its fair share of the available bandwidth is. In slow-start, for every packet that is correctly received (i.e., acknowledged), the congestion window is expanded by a factor of 2; which is an aggressive rate of increase despite the "slow-start" misnomer. In congestion-avoidance, TCP believes it is much closer to its fair share and probes the network much less aggressively. Instead of expanding the congestion window by a factor of 2, the congestion window is only expanded by a single packet after an entire congestion window worth of packets is acknowledged by the receiver. In both cases, once loss is detected, the congestion window is shrunk and the probing starts again.

Akamai optimizes TCP by tuning knobs that control where we start probing from (i.e., the initial congestion window), how quickly we expand the congestion window in both the slow-start (factor of 2 or 3 or higher) and congestion-avoidance (increase by 1 or 2 or higher) phases, as well as how much we back off when a loss is detected (shrink window by 50%, 30% or even less). That allows us to control how aggressive the protocol is in acquiring bandwidth. A TCP instance that probes aggressively and does not back off as much will acquire a larger share of the available bandwidth, under most network conditions.

TCP Optimizations, *available at* [https://developer.akamai.com/stuff/Optimization/TCP\\_Optimizations.html](https://developer.akamai.com/stuff/Optimization/TCP_Optimizations.html) (last visited November 29, 2015).

40. Akamai's TCP optimization has at least medium and low settings, which determine how aggressively TCP is optimized for the connection. Further, the selection of a level

of TCP optimization results in the timing of data transmission at the transport layer being modified as a function of the rate at which the congestion window is changed. On information and belief, Akamai's TCP optimization also results in changing the burst size of the connection.

41. Further, Akamai utilizes latency estimates to select the correct level of TCP optimization. As Akamai explains: "It's a reactive protocol. FastTCP, the Akamaized version of FastSoft's solution, attempts to estimate the correct transmission rate by utilizing latency estimates, among other things, without actually inducing loss. It's a proactive protocol." TCP Optimizations, *available at* [https://developer.akamai.com/stuff/Optimization/TCP\\_Optimizations.html](https://developer.akamai.com/stuff/Optimization/TCP_Optimizations.html) (last visited November 29, 2015).

42. Further, on information and belief, Akamai makes TCP optimization determinations based on a predetermined performance profile, for instance, based on the identity of the customer or the specific customer content provided by Akamai. On information and belief, this performance profile is stored on at least a customer-by-customer basis and is used to set the level of TCP optimization (such as medium and low).

43. Further, when an Akamai edge server with TCP optimization does not have content requested by an end-user in its own cache, the edge server can obtain that content from the cache or caches of neighboring or "parent" Akamai edge servers, provide that content to the end-user, and also store that same content in its own cache for future use. When an Akamai edge server obtains the missing content from the cache of an edge server hosted by XO, or vice versa, Akamai and XO act in concert or jointly to practice the claimed inventions and the infringement is not complete until both Akamai and XO have provided or performed their respective parts.

44. On information and belief, Akamai's TCP optimization, which infringes the asserted claims, utilizes technology that Akamai received from Limelight by way of its

acquisition of FastSoft, as discussed above at ¶¶ 24-28. As Akamai explains in its public documentation:

There has been a lot of research on TCP over the last 10–15 years, much of which has focused on improving some aspect of TCP’s behavior. The key finding is that TCP does not work well under all types of network characteristics, including loss/latency patterns, cross-traffic, how quickly the available bandwidth changes over time, and so on. In 2012 Akamai acquired FastSoft, a company that developed a novel transport solution that does not rely on detecting loss to adapt the congestion window. In general, TCP induces loss, by constantly probing for more available bandwidth, in order to estimate the correct transmission rate. It then reacts to the occurrence of loss. It’s a reactive protocol. FastTCP, the Akamaized version of FastSoft’s solution, attempts to estimate the correct transmission rate by utilizing latency estimates, among other things, without actually inducing loss. It’s a proactive protocol.

TCP Optimizations, *available at* [https://developer.akamai.com/stuff/Optimization/TCP\\_Optimizations.html](https://developer.akamai.com/stuff/Optimization/TCP_Optimizations.html).

45. The making, and operation, of the 155 Infringing Products as described above constitutes infringement of at least the above-mentioned claims of the 155 Patent pursuant to 35 U.S.C. § 271(a).

46. Unless enjoined by this Court, Akamai will continue to infringe the 155 Patent.

47. As a result of Akamai’s conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of Akamai’s infringement of the 155 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

## **COUNT II AGAINST AKAMAI:**

### **INFRINGEMENT OF U.S. PATENT NO. 7,715,324**

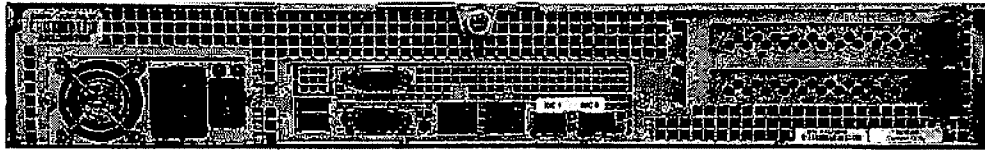
48. Limelight incorporates and realleges paragraphs 1-33 above as if fully set forth herein.

49. On information and belief, Akamai has infringed and continues to infringe one or more claims of the 324 Patent, including but not limited to claims 1, 2, 4, 5, 6, 7, 8, 10, and 11, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, the Akamai Intelligent Platform, including a content delivery network with edge servers running Akamai's TCP optimization functionality, as well as services associated therewith (the 324 Infringing Products). Based on information and belief, and publicly available documentation, the 324 Infringing Products perform TCP optimization by modifying pre-existing TCP settings based upon parameters that are determined at least in part with reference to information in the URLs of end-user requests processed by Akamai.

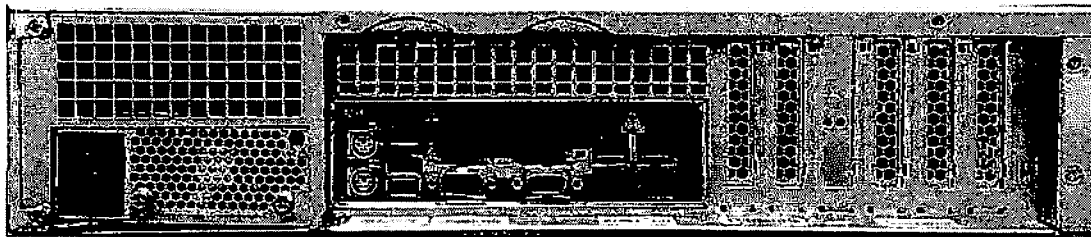
50. Specifically, Akamai's edge servers with TCP optimization, including on information and belief, edge servers that are co-located with XO, manage the delivery of content over network connections in satisfaction of the asserted claims, on information and belief and based on publicly available documentation.

51. The 324 Infringing Products include a protocol handler, such as the TCP/IP protocol stack implementation, that establishes and maintains connections with end-users.

52. On information and belief, to perform their basic role, Akamai's edge servers, including edge servers that are co-located with XO, include network ports used to receive and send communications over a network. For example, Akamai publishes the following images showing Akamai servers having Ethernet ports:



Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/images/Server\\_Hardware/X4i\\_1-5x18\\_10G\\_Rear\\_Large.jpg](https://fieldtech.akamai.com/heguide/images/Server_Hardware/X4i_1-5x18_10G_Rear_Large.jpg) (last visited November 29, 2015).



Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/images/Server\\_Hardware/X1\\_2x8\\_CacheH\\_Rear\\_Large.jpg](https://fieldtech.akamai.com/heguide/images/Server_Hardware/X1_2x8_CacheH_Rear_Large.jpg) (last visited November 29, 2015). Further information about Akamai's deployed network interfaces can be found in Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/Network\\_Packages.html](https://fieldtech.akamai.com/heguide/Network_Packages.html) (last visited November 29, 2015).

53. Further, Akamai's geographically distributed deployments of its edge servers, as deployed and operated for example by XO in its data centers, include routers that "allow Akamai to direct traffic between Akamai's equipment and the providers that Akamai connects to." [Akamai Hands And Eyes Guide], *available at* [https://fieldtech.akamai.com/heguide/Router\\_Hardware.html](https://fieldtech.akamai.com/heguide/Router_Hardware.html). When such equipment is deployed in a manner that connects Akamai's edge servers to the Internet, for example by XO in its data centers, it likewise has multiple ports configured to send and receive data over a connecting network.



54. The 324 Infringing Products perform TCP optimization in a manner that infringes the asserted claims. Specifically, the 324 Infringing Products monitor connections with end-users for requests. When they receive end-user requests Akamai's 324 Infringing Products determine a level of TCP optimization in part on reference to information in the URL of the request (such as for example, the hostname field, or the customer ID, which constitute alphanumeric strings). This information is utilized, in addition to other information, for the Akamai server, including on information and belief, cases where the edge server is co-located with XO to determine how aggressive the TCP optimization should be for that connection. Once that determination is made the TCP settings are altered to put that new optimization into effect by changing pre-existing TCP values to new values that are consistent with the correct level of TCP optimization. As Akamai's documentation explains in detail:

At a high-level, it operates in two modes: slow-start and congestion-avoidance. Those are different phases in the protocol that attempt to probe the network for available bandwidth using slightly different approaches. TCP maintains what's referred to as a congestion window, which determines how many packets can be in-flight on the network at any point in time. The higher the congestion window, the greater TCP believes its fair share of the available bandwidth is. In slow-start, for every packet that is correctly received (i.e., acknowledged), the congestion window is expanded by a factor of 2; which is an aggressive rate of increase despite the "slow-start" misnomer. In congestion-avoidance, TCP believes it is much closer to its fair share and probes the network much less aggressively. Instead of expanding the congestion window by a factor of 2, the congestion window is only expanded by a single packet after an entire congestion window worth of packets is acknowledged by the receiver. In both cases, once loss is detected, the congestion window is shrunk and the probing starts again.

Akamai optimizes TCP by tuning knobs that control where we start probing from (i.e., the initial congestion window), how quickly we expand the congestion window in both the slow-start (factor of 2 or 3 or higher) and congestion-avoidance (increase by 1 or 2 or higher) phases, as well as how much we back off when a loss is detected (shrink window by 50%, 30% or even less). That allows us to control how aggressive the protocol is in acquiring bandwidth. A TCP instance that probes aggressively and does not back off as much will acquire a larger share of the available bandwidth, under most network conditions.

TCP Optimizations, *available at* [https://developer.akamai.com/stuff/Optimization/TCP\\_Optimizations.html](https://developer.akamai.com/stuff/Optimization/TCP_Optimizations.html) (last visited November 29, 2015).

55. Thus, Akamai's TCP optimization has at least medium and low settings, which determine how aggressively TCP is optimized for the connection. Further, the selection of a level of TCP optimization results in the timing of data transmission at the transport layer being modified as a function of the rate at which the congestion window is changed.

56. This process of TCP optimization is performed, on information and belief, on multiple connections, including multiple simultaneous connections, including from different end-users, where the multiple connections are used to serve different content. On information and belief, the TCP optimization process employed by Akamai can apply different levels of TCP optimization to these different connections.

57. Further, Akamai utilizes other attributes such as latency estimates to select the correct level of TCP optimization. As Akamai explains: "FastTCP, the Akamaized version of FastSoft's solution, attempts to estimate the correct transmission rate by utilizing latency estimates, among other things, without actually inducing loss. It's a proactive protocol." TCP Optimizations, *available at* [https://developer.akamai.com/stuff/Optimization/TCP\\_Optimizations.html](https://developer.akamai.com/stuff/Optimization/TCP_Optimizations.html) (last visited November 29, 2015).

58. Further, on information and belief, Akamai makes TCP optimization determinations based at least in part on attributes associated with the identity of the customer or the specific customer content provided by Akamai. On information and belief these attributes and the information is stored on at least a customer-by-customer basis and is used to set the level of TCP optimization (such as medium and low).

59. On information and belief, Akamai's TCP optimization, which infringes the asserted claims, utilizes technology that Akamai received from Limelight by way of its acquisition of FastSoft, as discussed above at ¶¶ 24-28. As Akamai explains in its public documentation:

There has been a lot of research on TCP over the last 10–15 years, much of which has focused on improving some aspect of TCP's behavior. The key finding is that TCP does not work well under all types of network characteristics, including loss/latency patterns, cross-traffic, how quickly the available bandwidth changes over time, and so on. In 2012 Akamai acquired FastSoft, a company that developed a novel transport solution that does not rely on detecting loss to adapt the congestion window. In general, TCP induces loss, by constantly probing for more available bandwidth, in order to estimate the correct transmission rate. It then reacts to the occurrence of loss. It's a reactive protocol. FastTCP, the Akamaized version of FastSoft's solution, attempts to estimate the correct transmission rate by utilizing latency estimates, among other things, without actually inducing loss. It's a proactive protocol.

TCP Optimizations, *available at* [https://developer.akamai.com/stuff/Optimization/TCP\\_Optimizations.html](https://developer.akamai.com/stuff/Optimization/TCP_Optimizations.html).

60. The making and operation of the 324 Infringing Products as described above constitutes infringement of at least the above-mentioned claims of the 324 Patent pursuant to 35 U.S.C. § 271(a).

61. Unless enjoined by this Court, Akamai will continue to infringe the 324 Patent.

62. As a result of Akamai's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of Akamai's infringement of the 324 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT III AGAINST AKAMAI:**

**INFRINGEMENT OF U.S. PATENT NO. 8,683,002**

63. Limelight incorporates and realleges paragraphs 1-33 above as if fully set forth herein.

64. On information and belief, Akamai has infringed and continues to infringe one or more claims of the 002 Patent, including but not limited to claims 1, 2, 3, 4, 5, 7, 8, 9, 10, 13, 15, 16, 17, 18, and 20, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, the Akamai Intelligent Platform, including a content delivery network with edge servers, as well as services associated therewith (the 002 Infringing Products). Akamai's content delivery network includes a plurality of points of presence that are distributed geographically. These points of presence include edge servers. Based on information and belief, and publicly available documentation, edge servers that do not have user-requested content in their own caches can ask other edge servers whether they have the requested content in their caches and if so the content is provided to the user.

65. Specifically, the 002 Infringing Products include edge servers that receive end-user requests for content in the form of URLs. When such requests are received, if the content is not in the cache of the edge server, the edge server contacts neighboring edge servers to determine whether the neighboring edge servers have the user-requested content in their own caches. If the neighboring edge server has the requested content the content is served to the end user. As Akamai explains:

The edge server will check its local cache as well as the caches of other machines in the server deployment to see if the requested object has been seen before. If the object is found, the edge server will verify that the object is not stale and will serve it to the user.

If the object is found in the cache but it is stale, the edge server will contact another Akamai deployment or the origin to see if a newer version has been uploaded.

Client to Edge Servers to Origin, *available at* [https://developer.akamai.com/stuff/Overview/Client\\_Edge\\_Servers\\_Origin.html](https://developer.akamai.com/stuff/Overview/Client_Edge_Servers_Origin.html) (last visited November 29, 2015).

66. Further, if the edge server receiving the request for content that it does not have in its own cache is also unable to get that content from a neighboring edge server, the edge server requests the content from a server higher in Akamai's distribution hierarchy, including in some instances, the origin server, until it is able to retrieve the requested content. On information and belief, this process is based in part on analysis of the URL of the content request. As Akamai explains:

When an edge server gets a request for an object that it hasn't yet seen, it will download it from either another Akamai deployment or the origin. The customer's metadata determines whether the edge contacts the origin directly, or if it applies some sort of tiered distribution hierarchy.

Tiered distribution is used to provide greater origin offload by allowing many Akamai edge deployments to go forward to a smaller set of deployments which in turn go forward to the origin. In the case of Akamai's Site Shield product, the Customer's IT department can program the IP addresses of these top-tier machines into their firewall and block access to their network from all other Internet hosts.

At this point, caching rules are applied to the object and the requested bytes are delivered to the user.

Client to Edge Servers to Origin, *available at* [https://developer.akamai.com/stuff/Overview/Client\\_Edge\\_Servers\\_Origin.html](https://developer.akamai.com/stuff/Overview/Client_Edge_Servers_Origin.html) (last visited November 29, 2015).

67. In addition, the edge servers in a given instance of infringement can both be located within the same point of presence, and the infringement can involve all of the caches in a given point of presence. Likewise, the servers higher in the distribution hierarchy can also be located within different points of presence.

68. Further the edge server that received the request can serve the content to an end user acting as a proxy for the other edge server.

69. Also, on information and belief, the edge server that receives the request can query more than one edge server in overlapping time.

70. On information and belief, both Akamai and XO make and use infringing systems with respect to each of the acts of infringement described above. Akamai makes infringing systems that consist entirely of Akamai servers. Likewise on information and belief, XO makes and uses infringing systems where all of the servers are XO-hosted or operated servers. Further, when the infringing system includes a combination of Akamai and XO-hosted or operated servers, Akamai and XO act jointly or in concert to practice the claimed inventions, and the infringement is not complete until both Akamai and XO have provided or performed their respective parts.

71. The making, and operation, of the 002 Infringing Products as described above constitutes infringement of at least the above-mentioned claims of the 002 Patent pursuant to 35 U.S.C. § 271(a).

72. Unless enjoined by this Court, Akamai will continue to infringe the 002 Patent.

73. As a result of Akamai's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of Akamai's infringement of the 002 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT IV AGAINST AKAMAI:**

**INFRINGEMENT OF U.S. PATENT NO. 8,856,263**

74. Limelight incorporates and realleges paragraphs 1-33 above as if fully set forth herein.

75. On information and belief, Akamai has infringed and continues to infringe one or more claims of the 263 Patent, including but not limited to claims 1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20 pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, the Akamai Intelligent Platform, including a content delivery network with edge servers performing prefetching additional web pages and content to cache, prior to their being requested by an end user, as well as services associated therewith, also known as the “Akamai Instant” feature (the 263 Infringing Products). Based on information and belief, and publicly available documentation, Akamai’s edge servers accelerate delivery of web content by parsing requested web pages to identify additional web pages that are likely to be requested by a user system, and storing them to cache.

76. Specifically, Akamai’s edge servers with the Akamai Instant feature meet the requirements of the claimed systems and methods for accelerating access to resources of web pages, as reflected by publicly available Akamai documentation. On information and belief, Akamai’s edge servers include a cache for storing web content that can be used to store web content that has been “prefetched”—obtained before an end user client has asked for them. For example, Akamai states the following about the prefetching capabilities of its edge servers:

Before a base page (e.g. home page html) is served from the origin to the client, the Akamai edge server parses the content and prefetches predefined assets from the origin before the response is sent to the client, so they can be served from the edge cache when the client requests them.

“Of Preconnect, Prefetch and Preload,” <https://community.akamai.com/community/web-performance/blog/2015/09/24/of-preconnect-prefetch-and-preload>.

77. Akamai’s edge servers with the Akamai Instant feature can parse requested web pages to identify additional web pages that are likely to be requested by the user system, to

request those web pages and their specific content resources from another server before an end user requests them from the edge server, and store them in its cache. On information and belief, this ability includes the ability to obtain and store in cache static (non-dynamic) resources, such as image files. For example, Akamai states the following about the prefetching capabilities of its edge servers with Akamai Instant:

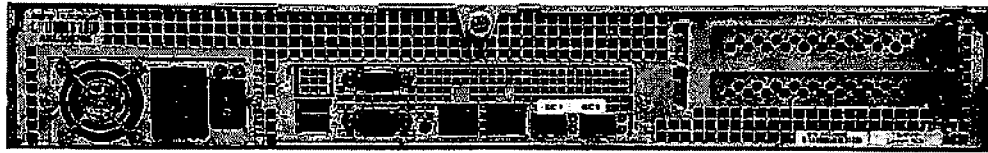
**In the past, when our customers have had long think-time applications due to database lookups, Web services calls, or other processing components that slow down origin response times, there wasn't much we could do to help other than speed the content once it was ready to be delivered. But by then it is usually too late. The new Terra Alta feature, Akamai Instant, now lets us tackle that delivery challenge head on. By designating the most likely next pages to be visited by users, Terra Alta is able to start the process of gathering content, making Web service calls, or doing database lookups, before the page is requested by the user, and pre-fetching that content to the edge of the Internet, close to users, prior to the user requesting it. We've seen this improve the performance of these applications by up to 100% over origin delivery.**

(emphasis added). "A Few More Tricks From Terra Alta," <https://blogs.akamai.com/2012/03/a-few-more-tricks-from-terra-alta.html> (last visited November 29, 2015).

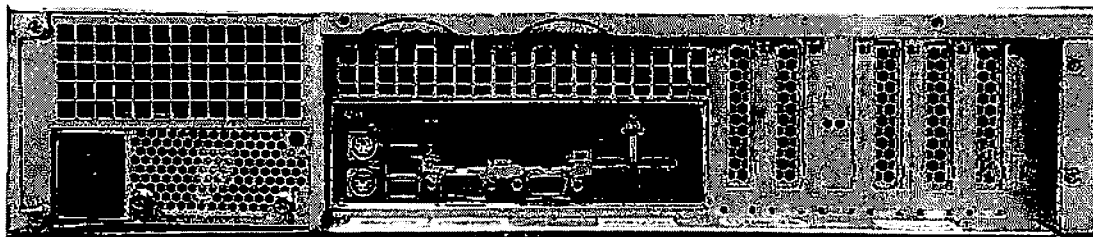
78. For example, edge servers with Akamai Instant can prefetch web resources identified in a first web page with the <a> or <link> HTML elements, which can include additional web pages, as described at <https://community.akamai.com/community/web-performance/blog/2015/09/24/of-preconnect-prefetch-and-preload>.

79. As deployed and operated, as for example by XO in its data centers, Akamai edge servers with Akamai Instant include interfaces that enable communication of one or more user nodes with one or more web servers. For example, Akamai publishes the following images showing Akamai servers having Ethernet ports:





Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/images/Server\\_Hardware/X4i\\_1-5x18\\_10G\\_Rear\\_Large.jpg](https://fieldtech.akamai.com/heguide/images/Server_Hardware/X4i_1-5x18_10G_Rear_Large.jpg) (last visited November 29, 2015).



Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/images/Server\\_Hardware/X1\\_2x8\\_CacheH\\_Rear\\_Large.jpg](https://fieldtech.akamai.com/heguide/images/Server_Hardware/X1_2x8_CacheH_Rear_Large.jpg) (last visited November 29, 2015). Further information about Akamai's deployed network interfaces can be found in Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/Network\\_Packages.html](https://fieldtech.akamai.com/heguide/Network_Packages.html) (last visited November 29, 2015).

80. Further, Akamai's geographically distributed deployments of its edge servers, as deployed and operated for example by XO in its data centers, include routers that "allow Akamai to direct traffic between Akamai's equipment and the providers that Akamai connects to." Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/Router\\_Hardware.html](https://fieldtech.akamai.com/heguide/Router_Hardware.html). When such equipment is deployed in a manner that connects Akamai's edge servers to the Internet, for example by XO in its data centers, it likewise has multiple ports configured to send and receive data over a connecting network.

81. On information and belief, because Akamai edge servers with Akamai Instant are designed and intended to respond to repeated requests for web content, both from the same end user device, and from different end user devices, these servers are able to perform the described prefetching functions for additional requests from end users, including where common resources are shared between pages.

82. The making, and operation, of Akamai edge servers with Akamai Instant as described above constitutes infringement of at least the above-mentioned claims of the 263 Patent pursuant to 35 U.S.C. § 271(a).

83. Unless enjoined by this Court, Akamai will continue to infringe the 263 Patent.

84. As a result of Akamai's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of Akamai's infringement of the 263 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT V AGAINST AKAMAI:**

**INFRINGEMENT OF U.S. PATENT NO. 9,015,348**

85. Limelight incorporates and realleges paragraphs 1-33 above as if fully set forth herein.

86. On information and belief, Akamai has infringed and continues to infringe one or more claims of the 348 Patent, including but not limited to claims 1, 2, 3, 7, 10-16, and 18 pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, the Akamai Intelligent Platform, including a content delivery network with edge servers that perform automated front end optimization ("FEO"). Based on information and belief, and publicly available documentation, Akamai's edge servers perform

front end optimization by using attributes associated with content requests to select a set of content acceleration techniques that will be applied to deliver the requested content, and utilize performance metrics obtained regarding the delivered content to dynamically improve the subsequent selection of content acceleration techniques for similar content.

87. Specifically, Akamai's edge servers with automated front end optimization meet the requirements of the claimed systems and method for dynamically selecting from among a plurality of acceleration techniques implemented in a Content Delivery Network (CDN) using attributes associated with content requests, as reflected by publicly available Akamai documentation.

88. Based on information and belief, and publicly available documentation, Akamai's Accused 348 Products can apply numerous techniques to accelerate the delivery of digital content to end users, including: combining, compressing, rewriting or otherwise "minifying" Javascript and CSS elements in web pages; optimizing (including compressing) image and other media files; running Javascript asynchronously; and reordering web resource delivery. As Akamai describes:

Front-end optimization reduces the number of requests, makes responses smaller, and reorders things to optimize rendering in the browser. There are dozens of different FEO optimization methods available in our service and the list continues to grow. FEO can reduce the number of requests by combining multiple JavaScript or CSS files into one download and by embedding small images directly into CSS. FEO can make responses smaller by minifying JavaScript and CSS, and by optimizing images. FEO also can unblock rendering of your page by running JavaScript asynchronously. Images can be made to load on demand, only as they scroll into view.

"FEO Fundamentals," *available at* <https://developer.akamai.com/stuff/FEO/index.html> (last visited November 29, 2015).

89. Other content acceleration techniques the Accused 348 Products perform include prefetching web content, optimizing TCP connections, caching the static portions of dynamically

rendered web pages (a feature known as EdgeStart), file versioning, domain sharding, and DNS prefetching. These and other content acceleration techniques the Accused 348 Products perform are described in Akamai public documentation, including at <https://www.akamai.com/jp/ja/multimedia/documents/white-paper/front-end-optimization-on-the-akamai-intelligent-platform-white-paper.pdf> (last visited November 29, 2015).

90. On information and belief, and as described in Akamai public documentation, the Accused 348 Products apply content acceleration techniques to requested content selectively, based in part on configuration files that are maintained by Akamai and its customers:

Akamai's edge servers are responsible for processing end user requests and serving the requested content, as well as for acting as intermediaries in our overlay network. The platform offers a rich set of functionality and content-handling features, developed over a decade of experience working with and supporting many of the most sophisticated websites and applications on the Internet. These controls not only ensure correct application behavior as experienced by the end user, but also optimize the performance of Applications under different scenarios.

An important feature of the edge server platform is its tremendous configurability via metadata configuration, which allows enterprises to retain fine-grained control in applying the platform's various capabilities to the handling of their content.

"The Akamai Network: A Platform for High-Performance Internet Applications," *available at* <https://www.akamai.com/us/en/multimedia/documents/technical-publication/the-akamai-network-a-platform-for-high-performance-internet-applications-technical-publication.pdf> (last visited November 29, 2015).

91. On information and belief, and as described in Akamai public documentation, the Accused 348 Products match attributes of content requests—such as the URL path, or header data in the request, or other attributes of the request such as end-user location or device type—to configuration data, to selectively apply content acceleration techniques to requested content:

The metadata system allows these features to be separately configured based on matching request and response attributes. While the simplest matches are on URL

path components, file extensions, and request methods, more advanced metadata matches can change behavior based on attributes including end-user geographic location, connection speed, HTTP request and response headers, cookie values, and many others....Metadata configuration can be set across an entire website, a portion of the site, a specific category of content, or even for individual files.

“The Akamai Network: A Platform for High-Performance Internet Applications,” *available at* <https://www.akamai.com/us/en/multimedia/documents/technical-publication/the-akamai-network-a-platform-for-high-performance-internet-applications-technical-publication.pdf> (last visited November 29, 2015).

92. On information and belief, and as described in Akamai public documentation, the Accused 348 Products obtain metrics regarding the performance of content acceleration techniques applied to specific content requests, and use those metrics to improve the selection and configuration of acceleration techniques that will subsequently be used for similar requests. For example, Akamai’s public documentation describes its “automated FEO solution” as follows:

For every end user request, Akamai’s proven technologies are dynamically applied in a way that optimizes performance for that unique scenario, taking into account real-time website, network, and end user conditions. Akamai’s FEO capabilities are an integrated part of these solutions, working in concert with our other performance, security, and availability offerings to deliver the best possible experience for every user, on every device, every time.

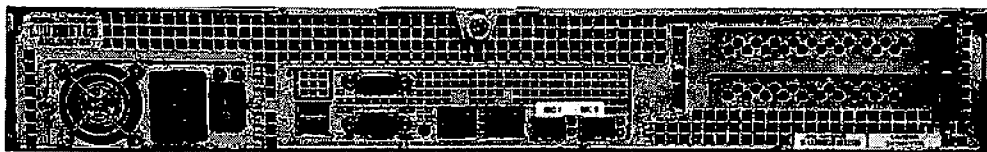
Front-End Optimization on the Akamai Intelligent Platform,  
<https://www.akamai.com/jp/ja/multimedia/documents/white-paper/front-end-optimization-on-the-akamai-intelligent-platform-white-paper.pdf>

93. The Accused 348 Products include hardware and software, such as a router, that provide an interface to a network. For example, Akamai’s geographically distributed deployments of its edge servers, as deployed and operated for example by XO in its data centers,

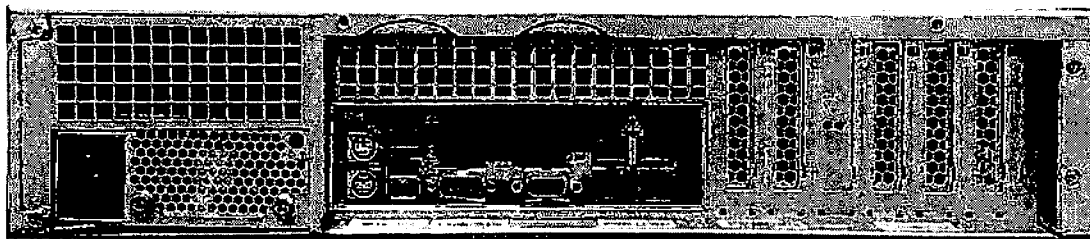
include routers that “allow Akamai to direct traffic between Akamai’s equipment and the providers that Akamai connects to.” [Akamai Hands And Eyes Guide], *available at* [https://fieldtech.akamai.com/heguide/Router\\_Hardware.html](https://fieldtech.akamai.com/heguide/Router_Hardware.html). When such equipment is deployed in a manner that connects Akamai’s edge servers to the Internet, for example by XO in its data centers, it is configured to receive requests from end users, such as from a device browser.

94. The Accused 348 Products include edge servers distributed throughout the United States and globally, such as those as deployed and operated by XO in its data centers. These edge servers include memory, storage devices, a processor, and interfaces to connect with a network interface, and to other edge servers and Akamai hardware and software located elsewhere in its content distribution network, and to apply selected content acceleration techniques as described above.

95. For example, on information and belief, to perform their basic role, Akamai’s edge servers have multiple network ports to send and receive data. As a further example, Akamai publishes the following images showing Akamai servers having two Ethernet ports:



Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/images/Server\\_Hardware/X4i\\_1-5x18\\_10G\\_Rear\\_Large.jpg](https://fieldtech.akamai.com/heguide/images/Server_Hardware/X4i_1-5x18_10G_Rear_Large.jpg) (last visited November 29, 2015).



Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/images/Server\\_Hardware/X1\\_2x8\\_CacheH\\_Rear\\_Large.jpg](https://fieldtech.akamai.com/heguide/images/Server_Hardware/X1_2x8_CacheH_Rear_Large.jpg) (last visited November 29, 2015). Further information about Akamai's deployed network interfaces can be found in Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/Network\\_Packages.html](https://fieldtech.akamai.com/heguide/Network_Packages.html) (last visited November 29, 2015). Likewise, Akamai's servers include processors:

#### Server Generations

The following server generations are listed from most recently deployed to no longer being deployed. This a brief overview of each generation's specifications.

Generation	Specifications ( Partial List )
X8	Intel Broadwell DE
X7	Intel Skylake Intel Haswell E3-1200 V5 series, up to 64 GB Unbuffered DDR4
X6m	Intel Haswell E5-2600 V3 series, 16G to 256G DDR4 Registered
X6	Intel Haswell E3-1200 V3 series, 16G or 32G DDR3
X5	Intel Sandy Bridge E5 2600 EP series, 128GB or 256GB DDR3
X4i	Intel Ivy Bridge E3-1270 V2, 16G DDR3
X4	Intel Sandy Bridge E3-1270, 16G DDR3
X2	Intel Nehalem X3470, 8G to 32G DDR3
X1	Intel Nehalem X3470, 8G DDR3
G10	AMD Opteron 6204 Quad Core, 64G DDR3
G9	AMD Opteron 4184 Hexa Core, 8G DDR3
G7	AMD Opteron 1389 Quad Core, 8G DDR2
G6	AMD Opteron 2381 Quad Core, 8G DDR2
G5	AMD Athlon II 240e Dual Core, 8G DDR3
G4	AMD Opteron 1218 Dual Core, 4G DDR2
G3	AMD Opteron 244, 2G or 4G M DDR1
G2	AMD Opteron 244, 1G or 2G DDR1
G1	AMD Opteron 244, 512M DDR1

Akamai Hands And Eyes Guide, *available at* [https://fieldtech.akamai.com/heguide/Server\\_Hardware.html](https://fieldtech.akamai.com/heguide/Server_Hardware.html) (last visited November 29, 2015).

96. The making, and operation, of the Accused 348 products as described above constitutes infringement of at least the above-mentioned claims of the 348 Patent pursuant to 35 U.S.C. § 271(a).

97. Unless enjoined by this Court, Akamai will continue to infringe the 348 Patent.

98. As a result of Akamai's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of Akamai's infringement of the 348 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT VI AGAINST AKAMAI:**

**INFRINGEMENT OF U.S. PATENT NO. 8,615,577**

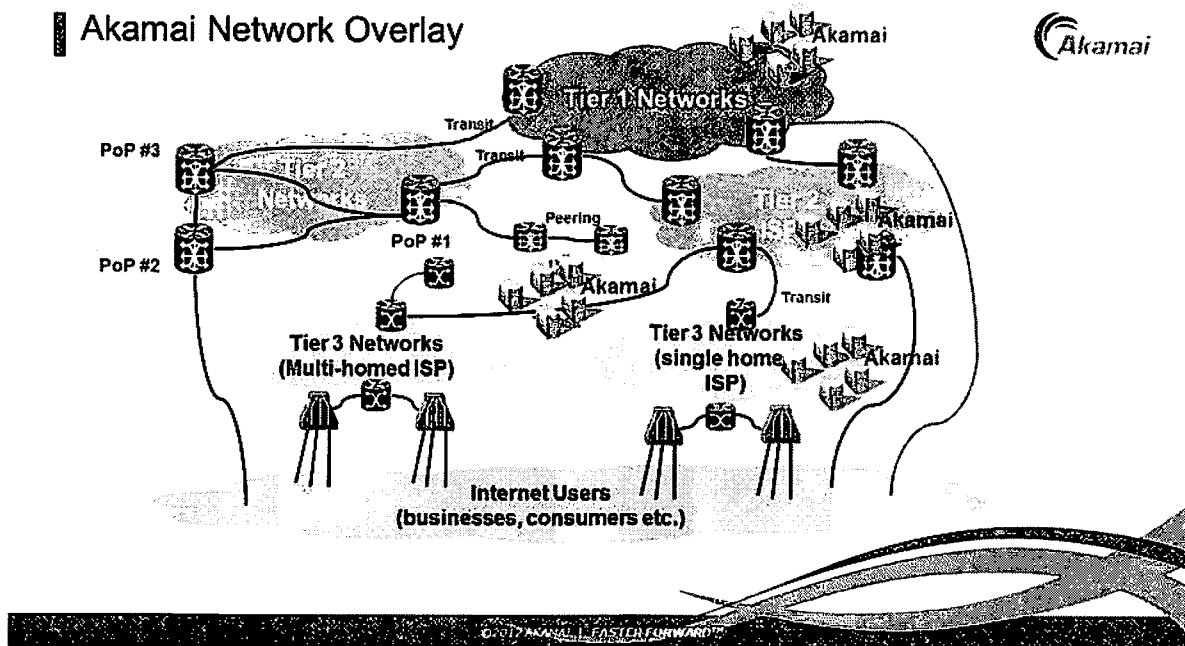
99. Limelight incorporates and realleges paragraphs 1-33 above as if fully set forth herein.

100. On information and belief, Akamai has infringed and continues to infringe one or more claims of the 577 Patent, including but not limited to claims 1, 2, 3, 4, 5, 6, 8, 9, 11, 16, and 19, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, Akamai's Image Converter and Image Manager products, as well as Akamai's cloud-based video transcoding products (the 577 Infringing Products).

101. The 577 Infringing Products constitute parts of the Akamai content delivery network, which Akamai illustrates as follows:



## Akamai Network Overlay



“Object Delivery,” available at [https://developer.akamai.com/stuff/Content\\_Delivery/Object\\_Delivery.html](https://developer.akamai.com/stuff/Content_Delivery/Object_Delivery.html) (last visited November 29, 2015).

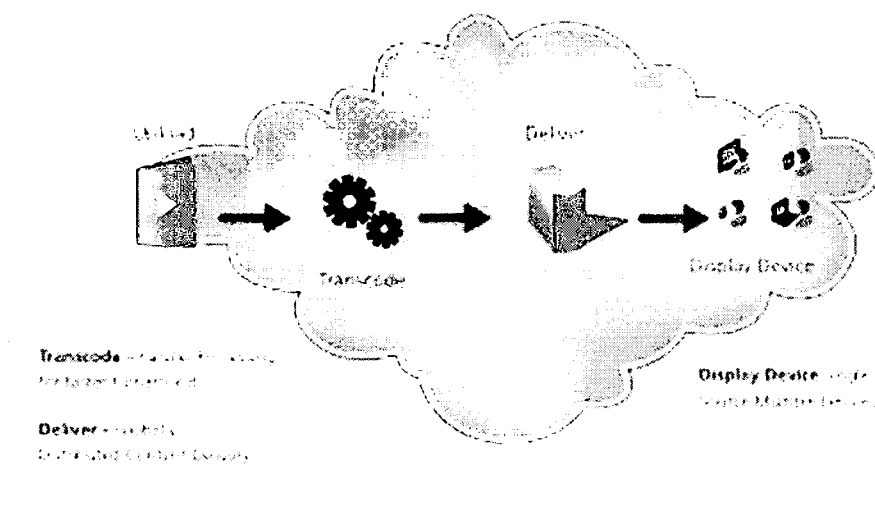
102. On information and belief, and from publicly available Akamai documentation, the 577 Infringing Products allow Akamai’s customers to upload image and video content (a process known as “ingest”). When the content is uploaded, it is determined (based on criteria that can be set by the customer) whether policies, that can be defined or customized by Akamai’s customers, apply to the ingested content. When the policies apply, they determine what kind of processing will be performed to the ingested content, such as video transcoding, or formatting and alteration of ingested images. The 577 Infringing Products maintain numerous processing functions that are matched with content by these (premade and customer-defined) policies. Moreover, the 577 Infringing Products maintain numerous policies that can be applied to different ingested content. These policies can be triggered based on the processing to be performed on the content, the location of the content itself, or both.

103. On information and belief, the application of these policies can be based on metadata (which can be stored in a database) of the content itself, information about the end user that subsequently requests the content, or information related to the provider of the content using specialized function calls that the patent refers to as “mutators.” Once it is determined which policy applies to the ingested content, such as a video or image file, the appropriate processing, such as video transcoding, or image formatting and alteration, is selected for processing that content. As Akamai explains with respect to video transcoding:

With Akamai, you simply set the initial configuration in the easy-to-use Luna Control Center and after that, the workflow is a completely automated process. Upload content to pre-defined watch folders and Akamai handles the rest. Whether you're processing one media file or 20,000, the same automated processes apply. You can also customize advanced transcoding parameters including number of renditions, video/audio bitrates, bitrate types (VBR/CBR), frame rate, keyframe rate, and resolution.

“Media Services On Demand Product Brief,” *available at* <https://www.akamai.com/us/en/multimedia/documents/product-brief/media-services-on-demand-product-brief.pdf> (last visited November 29, 2015). Akamai illustrates its video transcoding services as follows:

#### How it Works



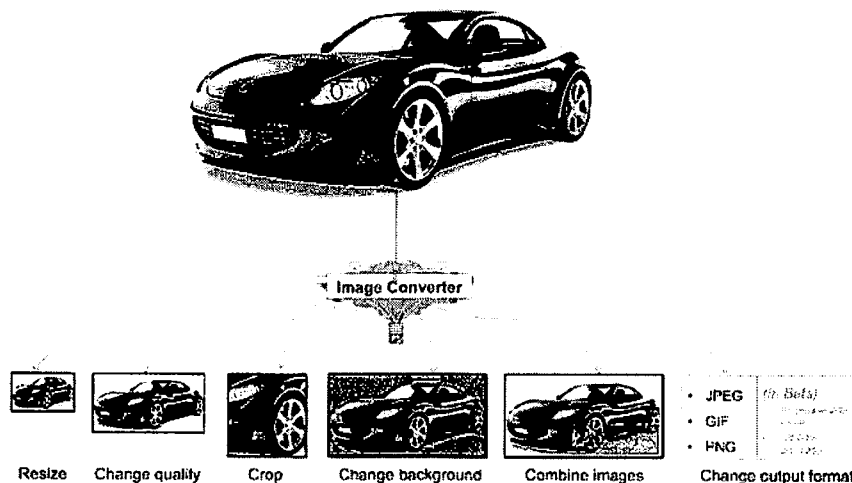
“Video On Demand Transcoding Product Brief,” <https://www.akamai.com/us/en/multimedia/documents/product-brief/vod-transcoding-product-brief.pdf> (last visited November 29, 2015).

104. Akamai provides the following explanation of Image Converter capabilities:

Image Converter supports real-time API commands including:

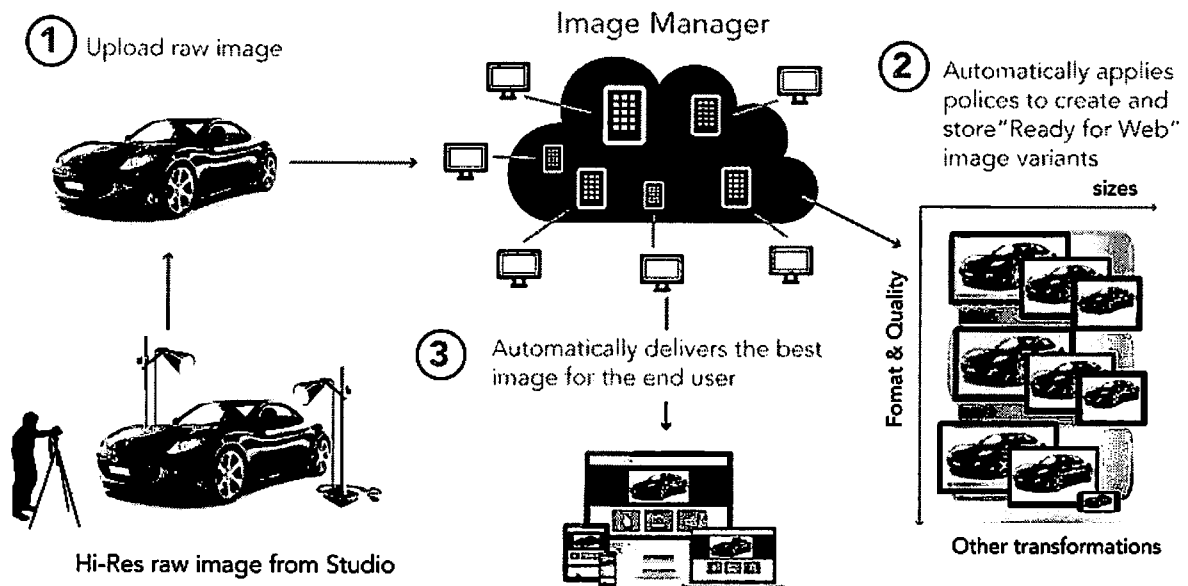
- **Downsize** – reduce an image’s dimensions.
- **Resize** – scale images to a specific width and height.
- **Crop** – crop, or cut out, a section of an image based on dimension and axis parameters.
- **Change Output Quality** – compress JPEG images based on a 1 to 100 scale.
- **Change Output Format** – change JPEG, PNG, GIF & TIFF images to a specific file type such as JPEG, PNG & GIF.
- **Background Color** – set the background color for transparent images using HTML or Hex colors.
- **Compose Images** – place an image in a specific location on top of another image e.g. for watermarking.

“Image Converter” available at <https://www.akamai.com/us/en/solutions/intelligent-platform/cloudlets/image-converter.jsp> (last visited November 29, 2015). Akamai illustrates Image Converter as follows:



*Id.*

105. As Akamai explains with respect to Image Manager: “Akamai provides developers with highly customizable policies to accommodate a wide range of image transformations. Begin with high-quality master images and quickly derive ready-for-web images that adapt to business, artistic and technical requirements.” “Image Manager Product Brief,” *available at* <https://www.akamai.com/us/en/multimedia/documents/product-brief/image-manager-product-brief.pdf> (last visited November 29, 2015). Akamai illustrates functionality of Image Manager as follows:



106. “Image Manager Product Brief,” <https://www.akamai.com/us/en/multimedia/documents/product-brief/image-manager-product-brief.pdf> (last visited November 29, 2015).

107. In addition, on information and belief the policies can be triggered by function calls that are built into template URLs. As Akamai explains: “Image Converter harnesses the power of the Akamai Intelligent Platform™ to enable organizations to dynamically manipulate images in the cloud through appending application programming interface (API) commands to

image URLs.” “Image Converter” *available at* <https://www.akamai.com/us/en/solutions/intelligent-platform/cloudlets/image-converter.jsp> (last visited November 29, 2015).

108. Likewise, as shown above, the functions that process the ingested content can be an HTTP-based application programming interface (API). *See id.*

109. The making, and operation, of the 577 Infringing Products as described above constitutes infringement of at least the above-mentioned claims of the 577 Patent pursuant to 35 U.S.C. § 271(a).

110. Unless enjoined by this Court, Akamai will continue to infringe the 577 Patent.

111. As a result of Akamai’s conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of Akamai’s infringement of the 577 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

#### **COUNT VII AGAINST XO:**

#### **INFRINGEMENT OF U.S. PATENT NO. 8,750,155**

112. Limelight incorporates and realleges paragraphs 1-47 above as if fully set forth herein.

113. On information and belief, XO has infringed and continues to infringe one or more claims of the 155 Patent, including but not limited to claims 1, 3, 8, 9, 10, 11, 12, 13, 15, 18, 19, and 20, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, hardware and software, content delivery servers and networks, and data centers that constitute or include 155 Infringing Products because of their inclusion and performance of the functionality described above with respect to Count I and the Akamai Intelligent Platform.

114. Specifically, XO provides services, networks, and data centers, that host servers that constitute 155 Infringing Products because they form all or part of CDNs including a plurality of points of presence that perform functionality related to the Akamai Intelligent Platform. These points of presence include edge servers that are operated or hosted by XO. Based on information and belief, and publicly available documentation, XO-operated or hosted edge servers perform TCP optimization by modifying pre-existing TCP settings based upon parameters that are determined at least in part with reference to information in the URLs of end-user requests as described above with respect to Count I including the specific variations described therein.

115. On information and belief, when XO assembles or configures a server, network, or data center that includes this functionality, and when it uses such server, network, or data center to provide services to its customers, these acts constitute acts of direct infringement of the 155 Patent for the same technical reasons explained above with respect to Count I except that in such instances XO is the direct infringer.

116. Both XO and Akamai make and use infringing systems. On information and belief, XO makes infringing systems that consist entirely of XO-hosted or operated servers. Likewise Akamai makes and uses infringing systems where all of the servers are Akamai servers. Further, when the infringing system includes a combination of XO and Akamai servers, Akamai and XO act jointly or in concert to perform the infringing acts, and the infringement is not complete until both XO and Akamai have provided or performed their respective parts.

117. Unless enjoined by this Court, XO will continue to infringe the 155 Patent.

118. As a result of XO's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered

damages as a result of XO's infringement of the 155 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT VIII AGAINST XO:**

**INFRINGEMENT OF U.S. PATENT NO. 7,715,324**

119. Limelight incorporates and realleges paragraphs 1-33 and 48-62 above as if fully set forth herein.

120. On information and belief, XO has infringed and continues to infringe one or more claims of the 324 Patent, including but not limited to claims 1, 2, 4, 5, 6, 7, 8, 10, and 11, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, hardware and software, content delivery servers and networks, and data centers that constitute or include 324 Infringing Products because of their inclusion and performance of the functionality described above with respect to Count II and the Akamai Intelligent Platform.

121. Specifically, XO provides services, networks, and data centers, which host servers that constitute 324 Infringing Products because they form all or part of CDNs including a plurality of points of presence that perform functionality related to the Akamai Intelligent Platform. These points of presence include edge servers that are operated or hosted by XO. Based on information and belief, and publicly available documentation, XO-operated or hosted edge servers perform TCP optimization by modifying pre-existing TCP settings based upon parameters that are determined at least in part with reference to information in the URLs of end-user requests as described above with respect to Count II including the specific variations described therein.

122. On information and belief, when XO assembles or configures a server, network, or data center that includes this functionality, and when it uses such server, network, or data center to provide services to its customers, these acts constitute acts of direct infringement of the 324 Patent for the same technical reasons explained above with respect to Count II except that in such instances XO is the direct infringer.

123. Unless enjoined by this Court, XO will continue to infringe the 324 Patent.

124. As a result of XO's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of XO's infringement of the 324 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT IX AGAINST XO:**

**INFRINGEMENT OF U.S. PATENT NO. 8,683,002**

125. Limelight incorporates and realleges paragraphs 1-33 and 63-73 above as if fully set forth herein.

126. On information and belief, XO has infringed and continues to infringe one or more claims of the 002 Patent, including but not limited to claims 1, 2, 3, 4, 5, 7, 8, 9, 10, 13, 15, 16, 17, 18, and 20, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, hardware and software, content delivery servers and networks, and data centers that constitute or include 002 Infringing Products because of their inclusion and performance of the functionality described above with respect to Count III and the Akamai Intelligent Platform.

127. Specifically, XO provides services, networks, and data centers, that host servers that constitute 002 Infringing Products because they form all or part of CDNs including a



plurality of points of presence that are distributed geographically and perform functionality related to the Akamai Intelligent Platform. These points of presence include edge servers that are operated or hosted by XO. Based on information and belief, and publicly available documentation, XO-operated or hosted edge servers that do not have user-requested content in their own caches can ask other edge servers whether they have the requested content in their caches and if so the content is provided to the user, including the specific variations described above with respect to Count III.

128. On information and belief, when XO assembles or configures a server, network, or data center that includes this functionality, and when it uses such server, network, or data center to provide services to its customers, these acts constitute acts of direct infringement of the 002 Patent for the same technical reasons explained above with respect to Count III except that in such instances XO is the direct infringer.

129. Both XO and Akamai make and use infringing systems. On information and belief, XO makes infringing systems that consist entirely of XO-hosted or operated servers. Likewise Akamai makes and uses infringing systems where all of the servers are Akamai servers. Further, when the infringing system includes a combination of XO and Akamai servers, Akamai and XO act jointly or in concert to perform the infringing acts, and the infringement is not complete until both XO and Akamai have provided or performed their respective parts.

130. Unless enjoined by this Court, XO will continue to infringe the 002 Patent.

131. As a result of XO's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of XO's infringement of the 002 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT X AGAINST XO:**

**INFRINGEMENT OF U.S. PATENT NO. 8,856,263**

132. Limelight incorporates and realleges paragraphs 1-33 and 74-84 above as if fully set forth herein.

133. On information and belief, XO has infringed and continues to infringe one or more claims of the 263 Patent, including but not limited to claims 1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, hardware and software, content delivery servers and networks, and data centers that constitute or include 263 Infringing Products because of their inclusion and performance of the functionality described above with respect to Count IV and the Akamai Intelligent Platform.

134. Specifically, XO provides services, networks, and data centers, that host servers that constitute 263 Infringing Products because they form all or part of CDNs including a plurality of points of presence that perform functionality related to the Akamai Intelligent Platform. These points of presence include edge servers that are operated or hosted by XO. Based on information and belief, and publicly available documentation, XO-operated or hosted edge servers perform prefetching of additional web pages and content to cache, prior to their being requested by an end user, as well as services associated therewith, also known as the “Akamai Instant” feature as described above with respect to Count IV including the specific variations described therein.

135. On information and belief, when XO assembles or configures a server, network, or data center that includes this functionality, and when it uses such server, network, or data center to provide services to its customers, these acts constitute acts of direct infringement of the

263 Patent for the same technical reasons explained above with respect to Count IV except that in such instances XO is the direct infringer.

136. Unless enjoined by this Court, XO will continue to infringe the 263 Patent.

137. As a result of XO's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of XO's infringement of the 263 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT XI AGAINST XO:**

**INFRINGEMENT OF U.S. PATENT NO. 9,015,348**

138. Limelight incorporates and realleges paragraphs 1-33 and 85-98 above as if fully set forth herein.

139. On information and belief, XO has infringed and continues to infringe one or more claims of the 348 Patent, including but not limited to claims 1, 2, 3, 7, 10-16, and 18, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, hardware and software, content delivery servers and networks, and data centers that constitute or include 348 Infringing Products because of their inclusion and performance of the functionality described above with respect to Count V and the Akamai Intelligent Platform.

140. Specifically, XO provides services, networks, and data centers, that host servers that constitute 348 Infringing Products because they form all or part of CDNs related to the Akamai Intelligent Platform including a content delivery network with edge servers that perform automated front end optimization ("FEO"). Based on information and belief, and publicly available documentation, XO-operated or hosted edge servers perform front end optimization by

using attributes associated with content requests to select a set of content acceleration techniques that will be applied to deliver the requested content, and utilize performance metrics obtained regarding the delivered content to dynamically improve the subsequent selection of content acceleration techniques for similar content as described above with respect to Count V including the specific variations described therein.

141. On information and belief, when XO assembles or configures a server, network, or data center that includes this functionality, and when it uses such server, network, or data center to provide services to its customers, these acts constitute acts of direct infringement of the 348 Patent for the same technical reasons explained above with respect to Count V except that in such instances XO is the direct infringer.

142. Unless enjoined by this Court, XO will continue to infringe the 348 Patent.

143. As a result of XO's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of XO's infringement of the 348 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

**COUNT XII AGAINST XO:**

**INFRINGEMENT OF U.S. PATENT NO. 8,615,577**

144. Limelight incorporates and realleges paragraphs 1-33 and 99-111 above as if fully set forth herein.

145. On information and belief, XO has infringed and continues to infringe one or more claims of the 577 Patent, including but not limited to claims 1, 2, 3, 4, 5, 6, 8, 9, 11, 16, and 19, pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, selling, and/or offering to sell in the United States without authority and/or importing into the United States without authority, hardware and software, content delivery servers and

networks, and data centers that constitute or include 577 Infringing Products because of their inclusion and performance of the functionality described above with respect to Count VI and the Akamai Intelligent Platform.

146. Specifically, on information and belief, XO provides services, networks, and data centers, that host servers that constitute 577 Infringing Products because they form all or part of CDNs related to the Akamai Intelligent Platform including a content delivery network including the Image Converter, Image Manager, and cloud-based video transcoding products, which store and apply the claimed policies to ingested content in the various manners described above with respect to Count VI including the specific variations described therein.

147. On information and belief, when XO assembles or configures a server, network, or data center that includes this functionality, and when it uses such server, network, or data center to provide services to its customers, these acts constitute acts of direct infringement of the 577 Patent for the same technical reasons explained above with respect to Count VI except that in such instances XO is the direct infringer.

148. Unless enjoined by this Court, XO will continue to infringe the 577 Patent.

149. As a result of XO's conduct, Limelight has suffered and will continue to suffer irreparable injury, for which it has no adequate remedy at law. Limelight has also suffered damages as a result of XO's infringement of the 577 Patent and will continue to suffer such damages, until an injunction issues, in an amount and manner yet to be determined.

#### **PRAYER FOR RELIEF**

150. Limelight respectfully prays for relief as follows:

(a) A judgment that Akamai and XO have infringed and continue to infringe one or more claims of the Asserted Patents;

- (b) A judgment awarding Limelight all damages adequate to compensate for Akamai's and XO's infringement, and in no event less than a reasonable royalty for Akamai's and XO's acts of infringement, including all pre-judgment and post-judgment interest at the maximum rate allowed by law;
- (c) A permanent injunction enjoining Akamai, and its directors, officers, employees, attorneys, agents, and all persons in active concert or participation with any of the foregoing, from further acts of infringement of the Asserted Patents;
- (d) A permanent injunction enjoining XO, and its directors, officers, employees, attorneys, agents, and all persons in active concert or participation with any of the foregoing, from further acts of infringement of the Asserted Patents; and
- (e) A judgment awarding Limelight such other relief as the Court may deem just and equitable.

**DEMAND FOR JURY TRIAL**

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiff Limelight demands a trial by jury in this action.

Date: November 30, 2015

Respectfully submitted,



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